

CLAIMS

1. A composite indium oxide particles which has an average particle size of 5 to 100 nm and which contains tin and zinc.

2. A composite indium oxide particle which has an average particle size of 5 to 100 nm and which comprises zinc oxide and tin-containing indium oxide.

3. A composite indium oxide particle which has an average particle size of 5 to 100 nm and which comprises zinc oxide and tin-containing indium oxide maintaining crystalline structures, respectively, characterized in that the volume resistivity of said particles compressed under a pressure of 14.7 MPa (150 kgf/cm²) is 10^{-3} to $10 \Omega\text{cm}$.

4. The composite indium oxide particle according to claim 2 or 3, wherein zinc oxide is coated with tin-containing indium oxide.

5. The composite indium oxide particle according to any one of claims 2 to 4, wherein the content of zinc oxide is 5 to 70 mol %.

6. The composite indium oxide particle according to any one of claims 2 to 5, wherein the content of tin in the tin-containing indium oxide phase is 3 to 30 mol %.

7. The composite indium oxide particle according to any one of claims 2 to 6, wherein a part of a metal element contained in at least one of zinc oxide and tin-containing indium oxide is substituted by at least one element selected from the group consisting of aluminum and gallium.

8. The composite indium oxide particle according to

claim 7, wherein the content of at least one element selected from the group consisting of aluminum and gallium is 0 to 30 mol %.

5 9. The composite indium oxide particle according to claim 7, wherein a part of the zinc atom in zinc oxide is substituted by at least one element selected from the group consisting of aluminum and gallium, and wherein the content of the substituting element is 0 to 30 mol % based on the mole of the zinc element in the zinc oxide phase.

10 10. The composite indium oxide particle according to claim 7, wherein a part of the tin atom or the indium atom in tin-containing indium oxide is substituted by at least one element selected from the group consisting of aluminum and gallium, and wherein the content of the substituting
15 element is 0 to 10 mol % based on the total mole of the tin element and the indium element in the tin-containing indium oxide phase.

 11. A process for manufacturing composite indium oxide particles, comprising the steps of:

20 adding a zinc compound which comprises zinc as a main component to an aqueous alkaline solution containing a tin salt dissolved therein,

 adding an aqueous solution of an indium salt to the aqueous solution of the tin salt containing the zinc
25 compound to form precipitates containing a hydroxide or hydrate of tin and indium,

 adjusting a pH of a suspension containing the precipitates to 4 to 12,

 treating the suspension by heating at a temperature

of 110 to 300°C in the presence of water,

filtering and drying the resultant product,

treating the product by heating at a temperature of
300 to 1,000°C in an air, and

5 treating the product by heating at a temperature of
150 to 400°C in a reducing atmosphere.

12. The process according to claim 11, wherein at
least one compound selected from the group consisting of
aluminum compounds and gallium compounds is added to the
10 aqueous solution of the tin salt which contains the zinc
compound, in the step of adding the aqueous solution of the
indium salt to said aqueous solution of the tin salt which
contains the zinc compound.

13. A conductive coating composition comprising the
15 indium oxide particles according to any one of claims 1 to
10, a binder and a solvent.

14. A conductive coating film formed by applying the
conductive coating composition according to claim 13, and
drying the resulting coating layer.

20 15. A conductive sheet comprising a sheet-form
substrate, and a transparent conductive coating film formed
on the substrate, wherein the conductive coating film
comprises the composite indium oxide particles according to
any one of claims 1 to 10.